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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Jee-hong Min

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EXAMINER

CHANG, AUDREY Y

ART UNIT

PAPER NUMBER

2872

DATE MAILED: 05/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

KS

Office Action Summary	Application No.	Applicant(s)	
	09/995,778	MIN ET AL.	
	Examiner	Art Unit	
	Audrey Y. Chang	2872	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 March 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 4, 10, 17 and 32-49 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 4, 10, 17 and 32-49 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

Remark

- This Office Action is in response to applicant's amendment filed on March 8, 2004, which has been entered into the file.
- By this amendment, the applicant has amended claims 4, 10 and 17, has canceled claims 1-3, 5-9, 11-16 and 18-31 and has newly added claims 32-49. Applicant has also amended Figures 2A and 2B.
- Claims 4, 10, 17 and 32-49 remain pending in this application.
- The rejections to claims 1, 4, 9-10, 17 and 24 under 35 USC 112, first paragraph, set forth in the previous Office Action are **withdrawn** in response to applicant's amendment.
- The objection to claim 17 set forth in the previous Office Action is **withdrawn** in response to applicant's amendment.

Response to Amendment

1. The amendment filed on March 8, 2004 is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: **Claim 17 has been amended** to include the feature "a reflective holographic element ... and arranged at an acute angle with respect to one of the first and second image sources". The specification only gives support for the holographic element to be parallel to the image source, (please see the elected species depicted by Figure 2B). No angle of any kind can be defined between the holographic element and the image source.

Applicant is required to cancel the new matter in the reply to this Office Action.

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Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. **Claims 17, 34, 37, 40, 43, 46, 49 are rejected under 35 U.S.C. 112, first paragraph**, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The reasons for rejections due to the newly added matters are set forth in the paragraph above.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. **Claims 4, 10, 17 and newly added claims 32-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Machtig et al (PN. 5,782,547) in view of the Japanese Patent issued to Hiroshi (JP 411326822A).**

Claims 4, 10 and 17 have been significantly amended, new grounds of rejections are stated as follows.

Machtig et al teaches a *display device* that displays *spatial objects* and **background image *simultaneously* to create *three dimensional illusion* wherein the display device comprises a *spatial object display* (150, Figure 12), and a *background image display* (120) together serve as the first and second**

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image sources for displaying a spatial object image (156), serves as the first image and a background image, serves as the *second image*. The display device further comprises a first *beam splitter* (106), which *transmits* a portion of the first image and *reflects* a portion of first image. The transmitted portion of the first image is reflected by a Fresnel lens (104) with a reflective surface such that it is then reflected by the beam splitter and to be projected to a second space for observation. The background image generated by the second image source (120) is transmitted by the beam splitter and projected via a second Fresnel lens (108) to a first space, which is behind the Fresnel lens (108). The spatial object image and the background image are projected to *different* spatial locations such that when viewed simultaneously, the spatial object image appears to be floating in the space as against to the background image and it appears to be three-dimensional. The beams splitter (104) serves as the first and second beam splitter.

With regard to claim 17, **Machtig et al** teaches in a different embodiment, a *display device* that displays *spatial objects* and **background image** *simultaneously* to create *three dimensional illusion* wherein the display device comprises a *spatial object display* (100, Figure 10), and a *background image display* (120) together serve as the *first and second image sources* for displaying a spatial object image (110) and a background image. The display device further comprises a first *beam splitter* (102) and a second *beam splitter* (106), wherein both beam splitters are partially transmissive and partially reflective mirrors. The first beam splitter (102) partially reflects the spatial object image toward the second beam splitter (106) and is reflected and projected via Fresnel lens to a space (110, Figure 10). The background image is partially transmitted by the second beam splitter and projected via the Fresnel lens to a second space, which appeared to be behind the Fresnel lens (108). The spatial object image and the background image are projected to *different* spatial locations such that when viewed simultaneously, the spatial object image appears to be floating in the space against the background image and it appears to be three-dimensional.

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This reference has met all the limitations of the claims with the exception that it does not teach explicitly to include a holographic optical element and the holographic optical element has aspherical lens function. **Hiroshi** in the same field of endeavor teaches an image display device wherein a *reflective holographic optical element* (10, Figure 7, and the abstract) having *aspherical lens function* is used with a beam splitter (7) to converge the image light to the desired location and to introduce *aberrations* correction to the display device. It would then have been obvious to one skilled in the art to apply the teachings by adding a holographic optical element with aspherical lens function to the image display device of Machtig et al for the benefit of adding *convergent* power to the image light so that the image display device could have a more compact design and for the benefit of adding aberrations correction to the image display device to improve the image quality. With regard to the specific arrangement of the beam splitter and the holographic optical element, **Hiroshi** teaches that the image light from the source (LCD) is first reflected by the beam splitter and directed to the holographic optical element, the reflected light from the holographic optical element is then transmitted by the beam splitter to the observation location. It would have been obvious to one skilled in the art to modify the elements of the display device of Machtig et al to incorporate this structural arrangement for the benefit of providing a more compact design for the display device.

With regard to claim 17, Machtig et al teaches that the beam splitters (102 and 106 in Figure 10) are each making an acute angle with one of the image sources. However it does not teach explicitly that the reflective holographic element is also making an acute angle with respect to the beam splitter. **Hiroshi** does teaches that the image source, the beam splitter and the reflective holographic element can be arranged to have acute angle defined between image source and beam splitter and between beam splitter and the reflective holographic element, (please see Figure 7). It would then have been obvious to one skilled in the art to apply the teachings of Hiroshi to arrange the elements accordingly for the benefit of fitting them in a compact and optical correlated manners for operation.

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With regard to claims 32-37, the **Machtig et al** teaches that the beam splitter partially reflects and partially transmits the image light, which therefore has half mirror functions. Although this reference does not teach explicitly that the beam splitter is made of a holographic element. However recording optical element as holographic optical element is rather common practice in the art, for one thing the nature of the holographic element provides more precise optical selectivity so that the optical function based on the selectivity will be more accurate. Such modification would therefore have been obvious to one skilled in the art for the benefit stated above.

With regard to claims 38-43, **Machtig et al** teaches that the spatial object image generated by the first image source is a *foreground* image and the appearance of the foreground image will be greatly enhanced if it is displayed against a *black background*, (please see column (9). This suggests that the foreground image is brighter than the background image.

With regard to claims 44-49, **Machtig et al** teaches that the foreground image could have *movement* to enhance the dimensionality, (please see column 9, lines 15-20).

Response to Arguments

6. Applicant's arguments with respect to claims 4, 10 and 17 have been considered but are moot in view of the new ground(s) of rejection. The newly added claims have been fully considered and they are rejected for the reasons stated above.

7. Applicant's arguments are mainly drawn to the amendments to the claims and they have been fully addressed in paragraphs above.

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Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

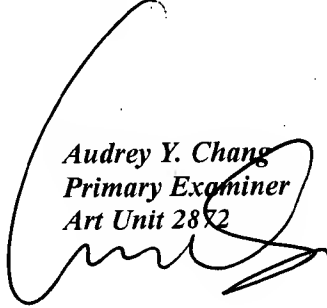
9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Audrey Y. Chang whose telephone number is 571-272-2309. The examiner can normally be reached on Monday-Friday (8:00-4:30), alternative Mondays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on 571-272-2312. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Audrey Y. Chang
Primary Examiner
Art Unit 2872



A. Chang, Ph.D.